

## THE ZEBRA AND THE QUAGGA MUSSELS



Picture 1. Zebra mussels (source: [www.nyis.info](http://www.nyis.info))

The zebra mussel (*Dreissena polymorpha*) and the quagga mussel (*Dreissena bugensis*) are small freshwater mussels from the Caspian Sea in Asia. These small mussels are able to quickly invade a body of water like a lake or a river. They were accidentally introduced into the Great Lakes in the 1980s by the discharge of ballast water from merchant ships. Since then, they have spread throughout the Great Lakes, in inland waterways and other bodies of water in North America. The zebra and the quagga mussels are nearly identical although the quagga mussel is bigger. In this document we shall treat both mussels under the same name, the zebra mussel.

### HOW TO RECOGNIZE IT? (Pictures 1 and 5)

- Maximum size about 3 cm (and more in the case of quagga mussels)
- Triangular shell
- Brown or cream color striped with white or beige

### ECOLOGY OF THE ZEBRA MUSSEL

The zebra mussel is found in lakes, streams, rivers and inland waterways. It prefers still waters. Saltwater is a natural barrier to their spread. It requires a solid substrate<sup>1</sup> to fix itself on, using filaments. This substrate can be a boat hull, a boat engine, a pipe, a trailer, a rock, a dock, a pillar, an aquatic plant or another mussel! (Picture 2)

It feeds on small organisms in suspension into the water (plankton) by filtering up to one liter per day! In the Great Lakes, zebra mussels reach a density of 700 000 per square meter. Elsewhere in Quebec, the density is lower with about 40 000 individuals per square meter. In North America, zebra mussels live 2 to 3 years.

A female can lay 30 000 to 40 000 eggs per year. Reproduction occurs when the water temperature exceeds 12°C. The eggs hatch into larvae. These larvae, invisible to the naked eye, drift with currents for a period from 7 to 21 days during which they will metamorphose. The metamorphosis has four phases that



Picture 2. Zebra mussels on another mussel (source: [www.invasive.org](http://www.invasive.org))

<sup>1</sup> The quagga mussel can grow both on soft and solid substrate.

will lead to the fixation of the larvae onto a hard substrate onto which they may become adult zebra mussels. This mode of reproduction gives these mussels a very effective way of spreading. At the larval stage, the zebra mussel can be easily transported on boats, trailers, bait buckets or simply drifts with currents and easily colonizes other environments.



Picture 3. Zebra mussels blocking a pipe section (source: [www.nyis.info](http://www.nyis.info))

## IMPACTS

The zebra mussel causes damage to the environment, private and public infrastructures, boats and recreational sites.

The damages caused to the environment are mainly:

- Reduction of plankton into the water which represents the base of the food chain. Young fish, native mussels and other organisms are starved
- Decrease in fish and fish eggs survival
- Increases the development of aquatic vegetation

The damages caused to the infrastructures are mainly (picture 3):

- Clogging of water filtration plants
- Blocking of industrial and household water intakes
- Decreased flows in fire protection systems and farmland irrigation

Zebra mussels cause big problems to boats (picture 4):

- Attachment to hulls causes significant damage and increases the fuel consumption
- Damage to internal and external parts of boat engines

Zebra mussels also have an impact on swimming. The colonies at the bottom of lakes can cut the swimmers' feet and the accumulation of shells on beaches creates an unpleasant smell.



Picture 4. Zebra mussels on a boat engine (source: [www.protectyourwaters.net](http://www.protectyourwaters.net))

## CONTROL METHODS

Several types of treatment exist. Whether chemical, electrical, thermal, biological or mechanical, these treatments are expensive and either ineffective or impossible to realize in the wild.

## VECTORS

Some vectors are natural as the flow of rivers or aquatic animals (ducks, beavers and others). However, the most important vector in causing real damages is human kind! Here are the main spreaders:

- Boaters (boats, rowboats, canoes, kayaks, jet skis, etc.) can easily spread these alien invasive species. Transport of a boat from a body of water to another provides a strong risk of contamination
- Anglers and hunters (boats, fishing and hunting equipment, bait buckets, etc.)
- Seaplanes
- Scuba divers
- Merchant ships



Picture 5. Different forms of zebra mussels (source: [www.invasive.org](http://www.invasive.org))

## WEBSITES

For more information or to find the information above you can visit the following websites:

<http://www.mddep.gouv.qc.ca/biodiversite/nuisibles/zebree.htm>

<http://www.especiesenvahissantes.gc.ca/Francais/LinkSearch.asp?x=1&formAction=SubjectArea>

<http://www.mrn.gouv.qc.ca/>

<http://archives.radio-canada.ca/environnement/pollution/clips/7308/>

<http://www.invadingspecies.com/InvadersFR.cfm?A=Page&PID=1>

<http://www.anstaskforce.gov/default.php>

[http://www.protectyourwaters.net/hitchhikers/mollusks\\_zebra\\_mussel.php](http://www.protectyourwaters.net/hitchhikers/mollusks_zebra_mussel.php)